

## Out of Wall Combination Fire Smoke Dampers

*Steel Airfoil Blades*

*UL 555S Leakage Class I*

*UL 555 1½ Hour Fire Resistance Rating*

*Horizontal or Vertical Mount*

### Application

Model OFSD-312 is an 'out of the wall' high performance combination fire smoke damper with class II leakage. OFSD-312 is approved for use in walls, partitions, and floors with fire resistance ratings less than 3 hours. Removal of wall grille allows access to actuator and other components. High strength airfoil blades insure the lowest resistance to airflow in HVAC systems with velocities to 3000 fpm (15.2 m/s) and pressures to 4 in. wg (1 kPa). Model OFSD-312 shall be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

### Ratings

#### UL555 Fire Resistance Rating:

**Fire Rating:** 1½ hours in walls  
**Dynamic Closure Rating:** Actual ratings are size dependent  
**Max. Velocity:** up to 3000 fpm (15.2 m/s)  
**Max. Pressure:** 4 in. wg (1 kPa) - differential pressure

#### UL555S Leakage Rating:

**Leakage Class:** I  
**Operational Rating:** Actual ratings are size dependent  
**Max. Velocity:** up to 3000 fpm (15.2m/s)  
**Max. Pressure:** 4 in. wg (1 kPa)  
**Max. Temperature:** 350°F (177°C)- depending upon the actuator

### Standard Construction

**Frame:** 5 in. x 1 in. (127mm x 25mm) galvanized steel hat channel with reinforced corners. A low profile head and sill are used on sizes less than 17 in. (432mm) high.

**Blades:** Double skin airfoil shape of galvanized steel with full length structural reinforcement. 14 ga. (2mm) equivalent thickness.

**Seals:** Extruded silicone rubber blade seals. Flexible stainless steel jamb seals.

**Linkage:** Concealed in jamb

**Fusible Link:** RRL 165°F (74°C)

**Axles:** ½ in. (13mm) dia. plated steel

**Bearings:** Bronze sleeve type

**Sleeve:** Galvanized; wrapped with thermal blanket

### Size Limitations:

**Minimum Size:** 12 in. W x 12 in. H (305mm x 305mm)

**Maximum Size:**

Single section: 32 in. W x 30 in. H (813mm W x 762mm H)

Multiple Section: 36 in. W x 36 in. H (914mm x 914mm)

### Optional Features:

- POC retaining Angles
- RRL/OCI (open closed indication switches)
- 165°F (74°C), 212°F (100°C), 250°F (121°C), 350°F (177°C) RRL's available
- TOR (remote override allows damper to perform smoke management functions during fire emergency.)
- Electric or pneumatic actuators to accomplish smoke management and system functions.
- Smoke detectors
- Momentary switch
- PRV (pneumatic relief valve)
- Security bars
- Sealed transition and sleeves

Model OFSD-312 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

#### National Fire Protection Association

NFPA Standards 80, 90A, 92A, 92B, 101 & 105

#### IBC International Building Codes

#### ICBO Uniform Building Codes

#### CSFM California State Fire Marshal

Fire Damper Listing (#3225-0981:103)

Leakage (Smoke) Damper Listing (#3230-0981:104)

#### New York City (MEA listing #260-91-M)

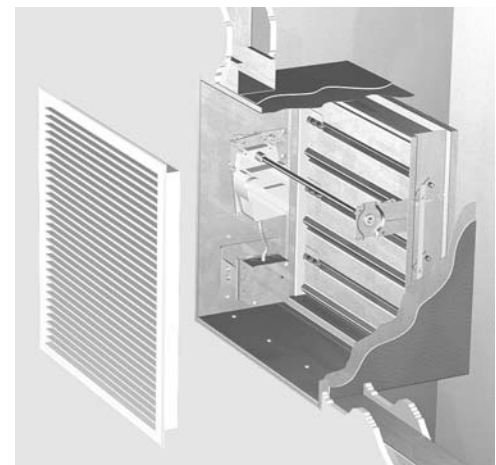
**"UL CLASSIFIED (see complete marking on product)"**

**"UL CLASSIFIED to Canadian safety standards (see complete marking on product)"**

Standard 555 & 555S (Listing #R13317)



Greenheck Fan Corporation certifies that the model OFSD-312 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.



\* W & H dimensions furnished approximately ¼ in. (6mm) undersize. Add blanket thickness (½ in. [3mm]) and sleeve thickness for overall sleeved damper dimension)

#### Oversize wall opening as follows:

Nominal damper size plus ¾ in. (9.5mm) (see Page 6)

This pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of .075 lb/ft<sup>3</sup> (1.201 kg/m<sup>3</sup>).

Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

## AMCA Test Figures

**Figure 5.3** Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

**Figure 5.2** Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

**Figure 5.5** Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

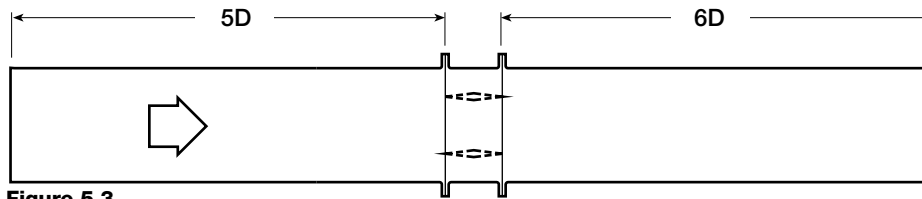


Figure 5.3

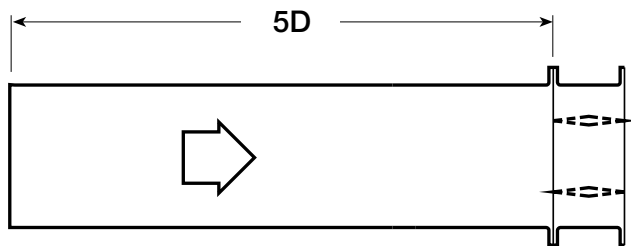


Figure 5.2

$$D = \sqrt{\frac{4(W)(H)}{3.14}}$$

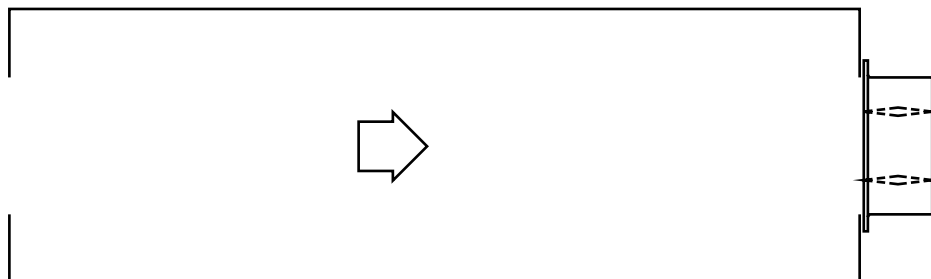
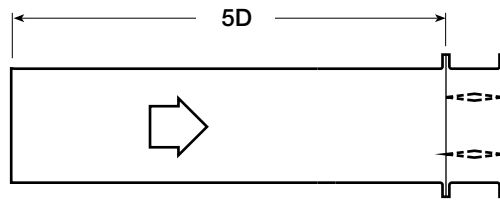
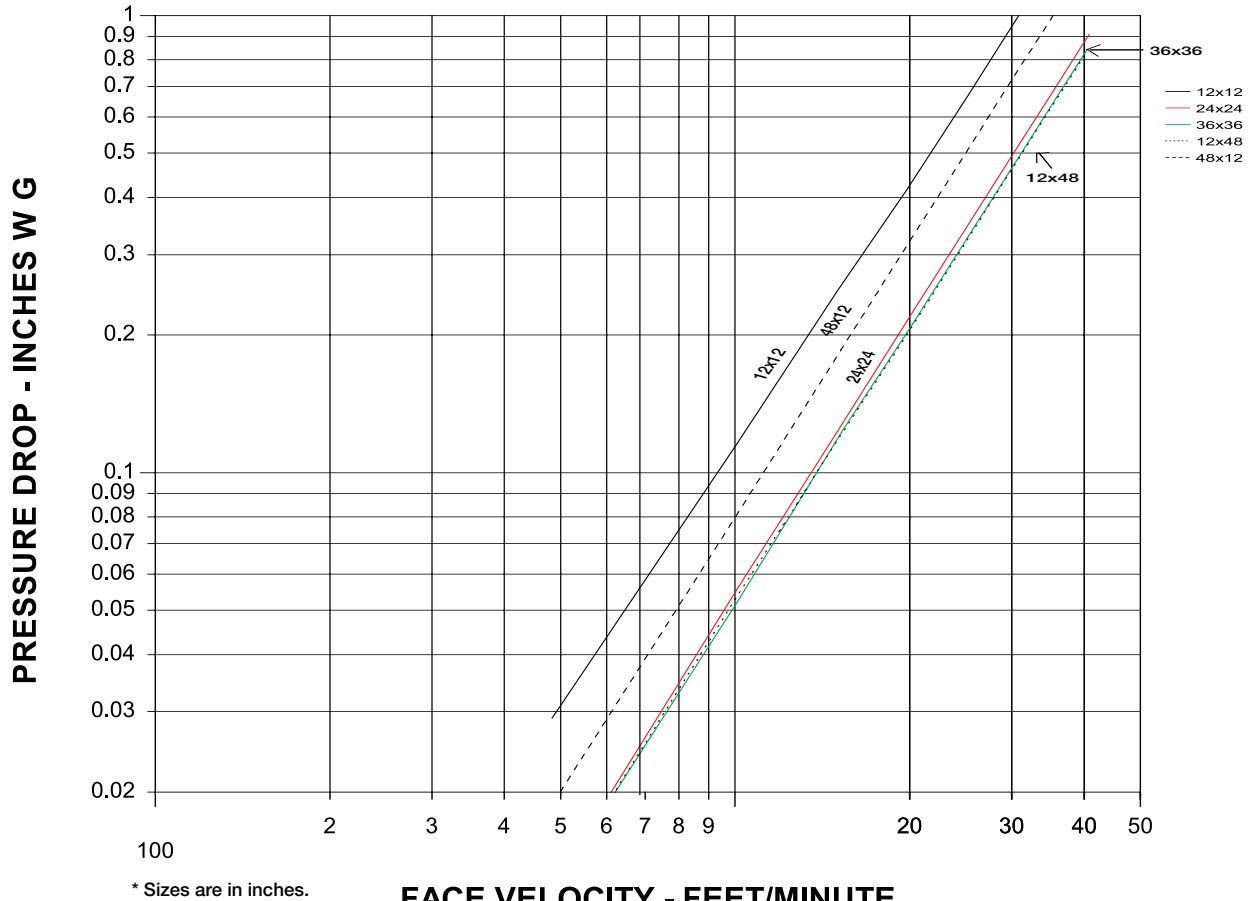


Figure 5.5



## VELOCITY VS. PRESSURE DROP



**FACE VELOCITY - FEET/MINUTE**  
**AMCA FIG. 5.2**

12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.26
2000	0.46
2500	0.72
3000	1.04
3500	1.41
4000	1.84

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.12
2000	0.22
2500	0.34
3000	0.49
3500	0.67
4000	0.87

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.12
2000	0.22
2500	0.34
3000	0.49
3500	0.67
4000	0.88

12 in. X 48 in. (305mm x 1219mm)

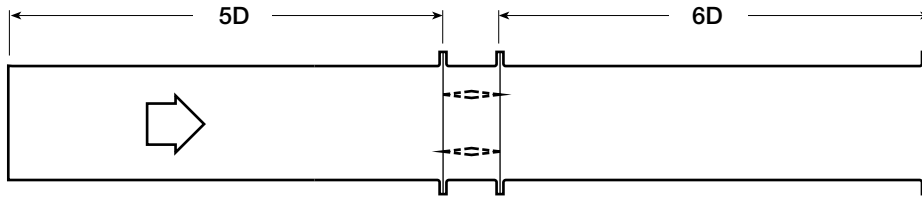
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.05
1500	0.12
2000	0.21
2500	0.33
3000	0.48
3500	0.65
4000	0.85

48 in. x 12 in. (1219mm x 305mm)

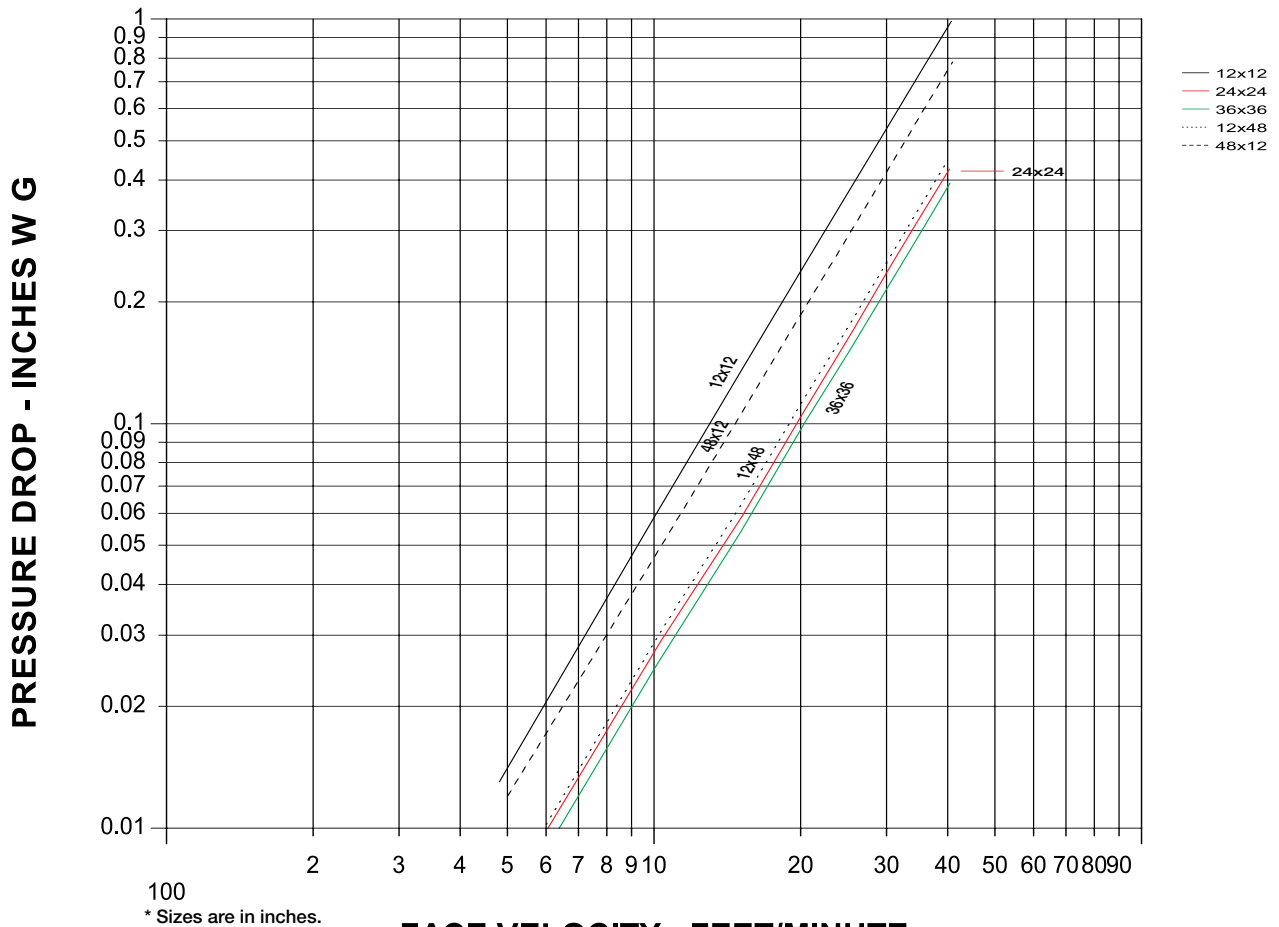
Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.08
1500	0.18
2000	0.33
2500	0.51
3000	0.74
3500	1.00
4000	1.31



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## VELOCITY VS. PRESSURE DROP\*



\* Sizes are in inches.

## FACE VELOCITY - FEET/MINUTE AMCA FIG. 5.3

12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.13
2000	0.23
2500	0.37
3000	0.53
3500	0.73
4000	0.95

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.02
1500	0.06
2000	0.10
2500	0.16
3000	0.23
3500	0.32
4000	0.42

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.02
1500	0.05
2000	0.09
2500	0.14
3000	0.21
3500	0.29
4000	0.38

12 in. X 48 in. (305mm x 1219mm)

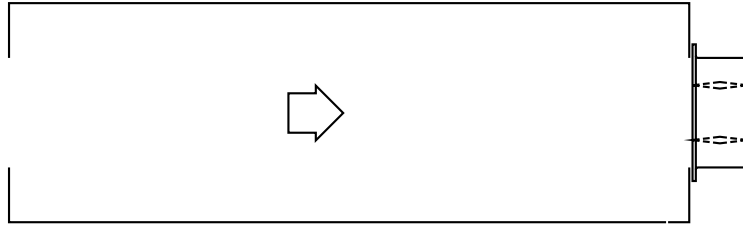
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.02
1500	0.06
2000	0.10
2500	0.16
3000	0.24
3500	0.33
4000	0.43

48 in. x 12 in. (1219mm x 305mm)

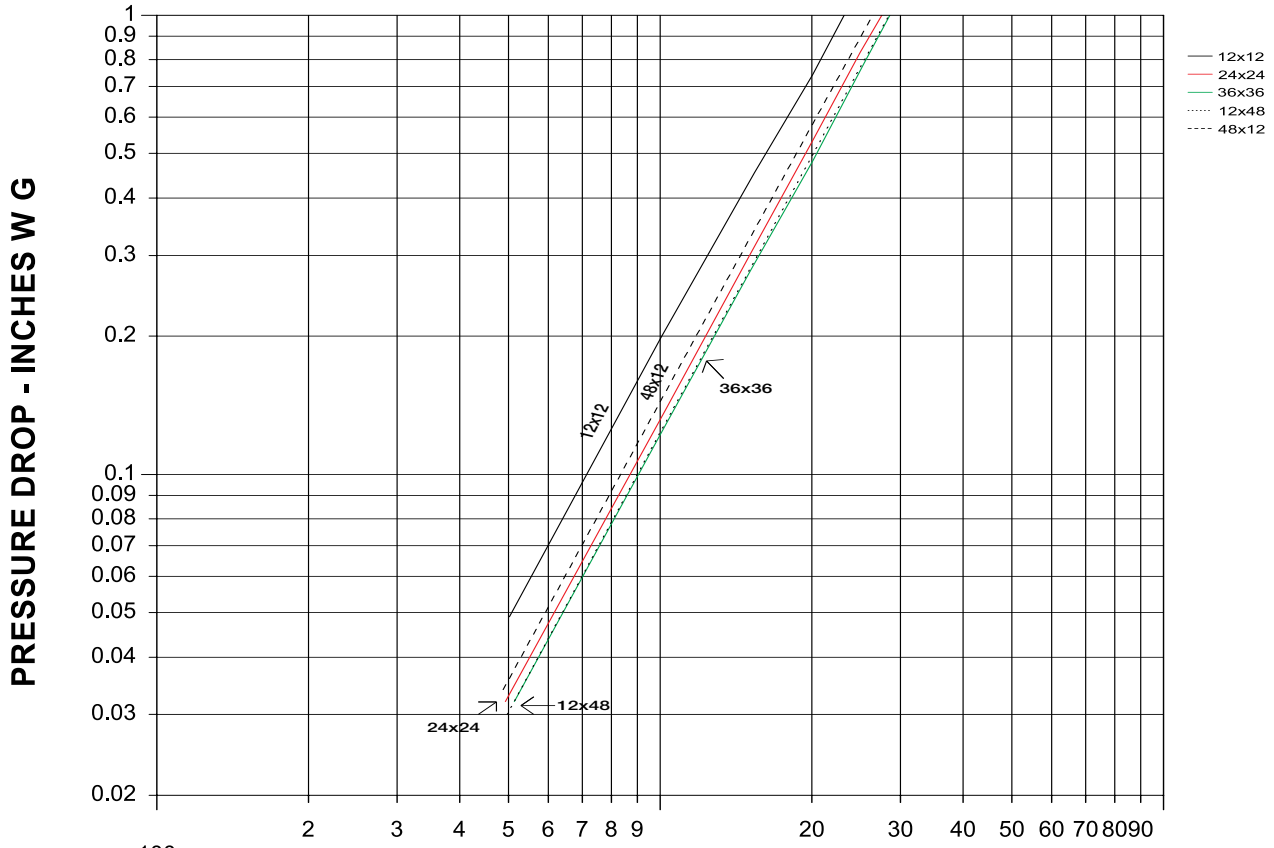
Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.10
2000	0.18
2500	0.29
3000	0.42
3500	0.57
4000	0.74



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**VELOCITY VS. PRESSURE DROP\***



\* Sizes are in inches.

**FACE VELOCITY - FEET/MINUTE  
AMCA FIG. 5.5**

12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.18
1500	0.42
2000	0.75
2500	1.17
3000	1.68
3500	2.29
4000	2.09

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.13
1500	0.29
2000	0.52
2500	0.81
3000	1.17
3500	1.60
4000	2.14

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.27
2000	0.48
2500	0.75
3000	1.08
3500	1.48
4000	1.93

12 in. X 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.27
2000	0.49
2500	0.77
3000	1.11
3500	1.51
4000	1.97

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.14
1500	0.32
2000	0.57
2500	0.89
3000	1.28
3500	1.75
4000	2.29



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# Application Data

# OFSD-312

## Actuator Space Envelopes

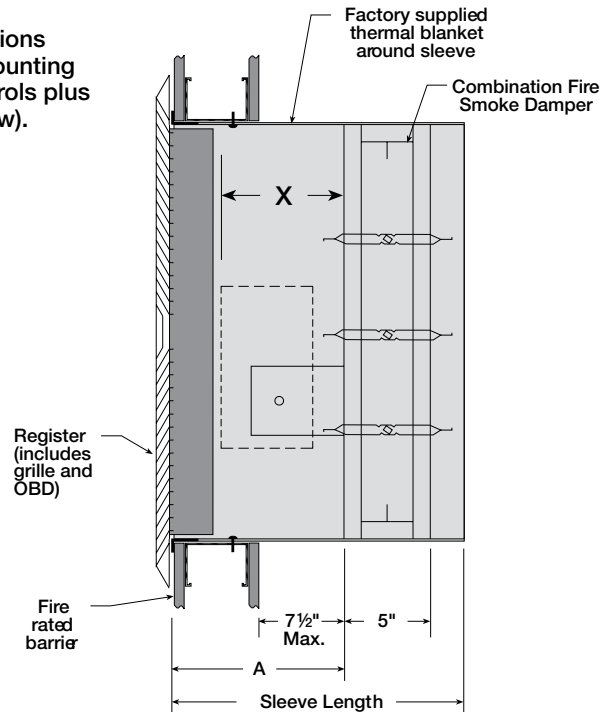
The drawing below and corresponding table show the minimum dimensions required for internal actuator mounting on OFSD-312s. The standard mounting locations provide enough space for the mounting of actuators and controls plus allowing space for a grille and duct connection (see Sleeve Length below).

Actuator Space Envelopes	Honeywell	
	ML-4XXX series MS4XXX series	MS-4120 series
'X' Dimension	5.88 in. (149mm)	5.88 in. (149mm)
Minimum Width	12 in. (305mm)	12 in. (305mm)
Minimum Height	12 in. (305mm)	12 in. (305mm)

## Sleeve Information

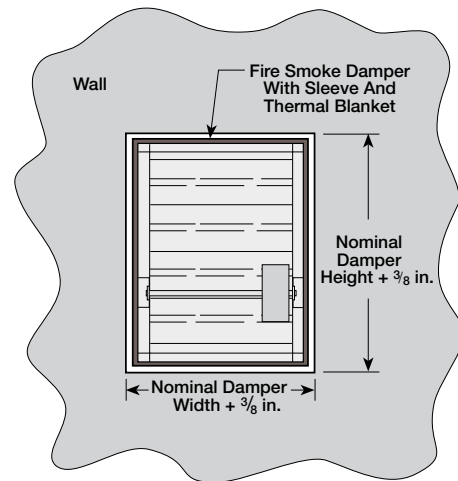
**'Sleeve Length' = Depth of Grille (or Register)**  
 + X (Actuator: see table above)  
 + 5 in. [127mm] (Damper Width)  
 + 1.25 in. [31.8mm] (for duct connection)  
 (round up to nearest length: 14 in., 16 in., 18 in., or 20 in. [356, 406, 457, 508mm])

**'Sleeve Gauge' = 16 Ga. or 20 Ga. (1.5mm or 1mm)**



## Wall Opening Sizing

To accommodate for sleeve and thermal blanket thickness, the wall opening must be oversized by  $\frac{3}{8}$  in. (9.5mm) as shown. For example, if the nominal damper size required is 18 in. x 14 in. (457mm x 356mm), the wall opening size needs to be 18  $\frac{3}{8}$  in. x 14  $\frac{3}{8}$  in. (467mm x 365mm). The damper itself is undersized  $\frac{1}{4}$  in. (6mm) on each dimension for an actual damper size of 17  $\frac{3}{4}$  in. x 13  $\frac{3}{4}$  in. (451mm x 349mm). This is also the inside dimensions of the sleeve (for grille considerations).



## Specifications

Combination Fire Smoke Dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules. Dampers shall meet the requirements of NFPA 80, 90A, 92A, 92B, 101 & 105 and further shall be tested, rated and labeled in accordance with the latest edition of UL Standards 555 and 555S. Dampers shall have a UL555 fire rating of 1 1/2 hours and be of low leakage design qualified to UL 555S Leakage Class II.

Each damper shall be UL qualified for mounting out of the plane of the wall to allow 'through the grille' access to actuator and controls. Each damper/actuator combination shall have a UL555S elevated temperature rating of 250° F (121°C) minimum and shall be operational and dynamic rated to operate at maximum design air flow at its installed location. Each damper shall be supplied with an appropriate actuator installed by the damper manufacturer at the time of damper fabrication.

Damper actuator shall be (specifier select one of the following) electric type for 120 (24 or 230) Volt operation. Each damper shall be

UL555S rated for leakage and airflow in either direction through the damper.

Damper blades shall be of the double skin airfoil type and shall have an equivalent thickness of 14 ga. (2mm) Damper frame shall be galvanized steel formed into a structural hat channel shape with reinforced corners. Bearings shall be sintered bronze sleeve type rotating in extruded holes in the damper frame. Blade edge seals shall be silicone rubber designed to inflate and provide a tighter seal against leakage as pressure on either side of the damper increases. Jamb seals shall be stainless steel compression type. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper.

Each damper shall be supplied with a factory mounted sleeve; sleeve shall be wrapped with UL approved thermal barrier material. Each damper shall be supplied with a 165°F (74°C) RRL.

The basis of design is Greenheck Model OFSD-312.

